

A NEW SPECIES OF GALL MIDGE (DIPTERA: CECIDOMYIIDAE) FROM
ECUADOR ASSOCIATED WITH FLOWERS OF *CLAVIJA*
(THEOPHRASTACEAE)

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Abstract.—A gall midge new to science, *Charidiplosis clavijica* Gagné, is described from specimens found standing on male flowers of *Clavija weberbaueri* (Theophrastaceae) in eastern Ecuador. The new species is notable for several unique characters involving the tarsal claws, the male antenna, and the female ovipositor. The new species is compared to the widespread and only other described congener, *Charidiplosis triangularis* (Felt), a species associated with flowers of cacao.

Key Words: Neotropical, *Charidiplosis*, pollination

Clavija is a Neotropical plant genus of 50 species (Ståhl 1991). The pollination and breeding system of *Clavija* species have not been studied previously in the field. Two of us (CO, SSR) are investigating floral morphology in *Clavija* in an attempt to determine which species are androdioecious, as suggested by Ståhl (1991). The reproductive biology of *Clavija weberbaueri* Mez. was studied during two stays at the Jatun Sacha Biological Reserve in eastern Ecuador in September, 1994 and October, 1995. This plant is an understory shrub of about 0.8–1.5 m height, frequent along trails at Jatun Sacha. Flowers are orange, bowl shaped, ca. 1 cm diameter, and emit a fruity scent, especially at night. The chemical composition of the floral scents of *C. euerganea* Macbr. and *C. repanda* Ståhl have been investigated by Knudsen and Ståhl (1994). Scents in these two species are very similar and consist almost exclusively of sesquiterpenes. In both years when *C. weberbaueri* was

studied at Jatun Sacha, numerous individuals were in bloom.

One of us (CO) monitored six shrubs with bisexual flowers and ten male shrubs from October until December in both years. The only visitors seen on the male flowers during several observation periods, both during the day and at night until 11 p.m., were gall midges of the new species described here. The flies remained immobile on the flowers for long periods of time, except at dusk when some individuals were observed to fly. Female flowering shrubs were extremely rare in both years, and we did not see any visitors on the few female flowers we found. Whether these gall midges pollinate the flowers is still unclear.

MATERIALS AND METHODS

The new species was collected by one of us (CO) in September, 1994 and October, 1995, at the Jatun Sacha Biological Reserve, Napo Province, Ecuador. The Re-

serve is located 8 km E of Puerto Misahualli on the eastern slope of the Andes at about 400 m elevation (01°04'S, 77°36'W). Mean annual precipitation at Jatun Sacha is 3600 mm and the average yearly temperature is about 24.5°C. Fresh-caught flies were killed and preserved in 70% ethanol and later slide mounted for scientific study using the method outlined in Gagné (1989, 1994). Specimens of the new species have been deposited in the Museo Ecuatoriano de Ciencias Naturales in Quito, Ecuador, and the National Museum of Natural History, Smithsonian Institution, (USNM) in Washington, DC, U.S.A. Terminology for adult morphology follows usage in McAlpine (1981).

***Charidiplosis clavijica* Gagné,
new species
(Figs. 1–7)**

Adult.—Head (Figs. 1–2): Eye 9–10 facets long at vertex, connate; facets all closely adjacent. Vertex with narrow, dorsal protuberance bearing 2 long setae. Frons with 3–4 setae per side. Labella elongate linear in frontal view, more or less ovoid in lateral view, with about 15 setae laterally and covered with fine, pliant setulae mesally. Labrum elongate, basally with several short, sensory setae, covered beyond base on dorsum with long, fine, pliant, setulae, and situated between the labellae. Hypopharynx wide, striated dorsally and with elongate, setulose ligule ventrally. Palpus 4 segmented, with basal palpiger. Antenna with 12 flagellomeres, pedicel enlarged, longer and wider than both scape and first flagellomere. Male flagellomeres (Fig. 2) gynecoid, cylindrical, with very short necks, and becoming successively narrower from base to apex; circumfila appressed, as 2 rings encircling the flagellomeres, interconnected by 2 longitudinal strands. Female flagellomeres as in male but all of same width.

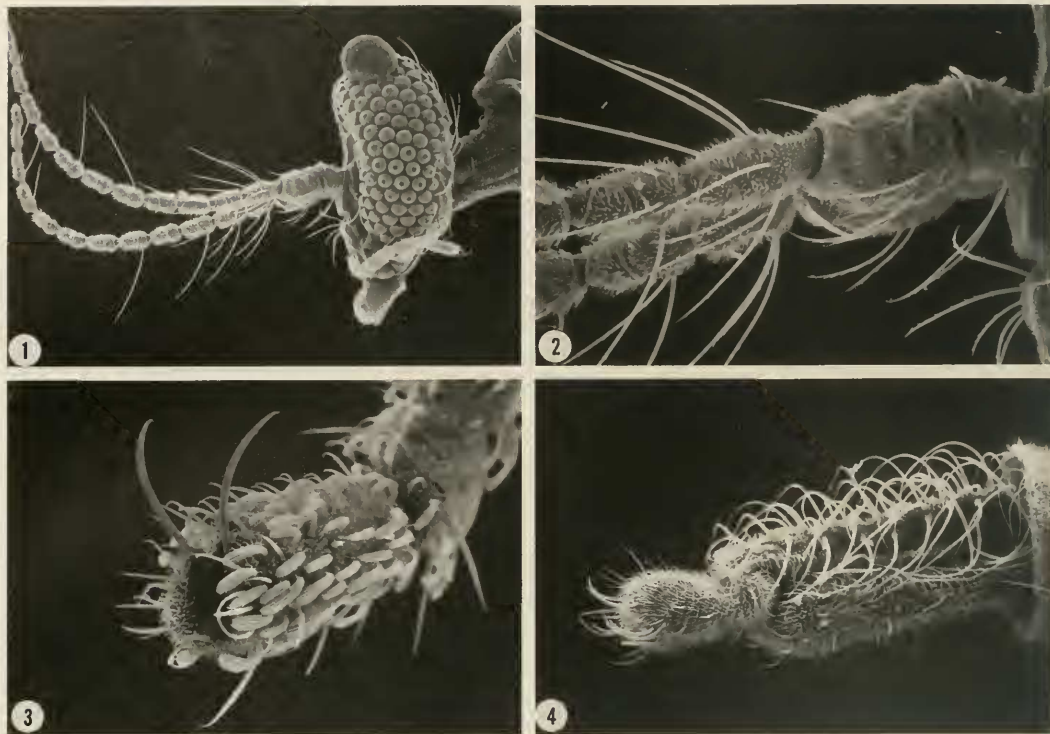
Thorax: Scutum with 4, single, sparse longitudinal rows of setae. Anepisternum without vestiture. Epimeron with 4–6 setae

in longitudinal row. Wing length: ♂, 1.4–1.6 mm (n = 5); ♀, 1.5–1.6 mm (n = 4); R₅ curved apically, joining C posterior to wing apex; Rs weak, oblique, situated proximal to mid distance between arculus and R₁ apex; M₃₊₄ evident on distal two-thirds length; Cu forked; CuP present before Cu fork. Fifth tarsomeres (Figs. 3, 7) with acropod partly hidden from view; claws simple, thin, curving near basal third; empodia and pulvilli rudimentary.

Male abdomen: First through sixth tergites entire, rectangular, with mostly single, continuous, posterior row of setae, 1–3 lateral setae on each side near midlength, sparse setiform scales covering most of sclerites, and pair of trichoid sensilla on anterior margin. Seventh tergite as for sixth but posterior row of setae interrupted mesally. Eighth tergite weakly sclerotized, anterior pair of trichoid sensilla the only vestiture. Genitalia (Fig. 5–6): cercus narrowing to rounded apex, with several posterior setae; hypoproct slightly longer than cercus, tapered gradually from base to very narrow apex, a pair of setae present apically; aedeagus longer than gonocoxite, tapered evenly from base to narrow apex; gonocoxite with short, obtuse mesobasal lobe, cylindrical beyond; gonostylus elongate, cylindrical, barely tapered from base to apex, setulose near base, asetulose and ridged beyond.

Female abdomen: First through seventh tergites as for male first through sixth. Eighth tergite square, shorter and narrower than seventh, with scattered setae on posterior half and anterior pair of trichoid sensilla. Eighth sternite present, with scattered setae and anterior pair of trichoid sensilla. Intersegmental membrane with scattered setae on all surfaces. Ninth tergum (Fig. 4) dorsally with elongate, curved setae, laterally and ventrally with short, scattered setae. Tenth tergum without setae. Cercus (Fig. 4) elongate-ovoid, completely setulose, with four apical to apicoventral sensory setae; hypoproct elongate, undivided.

Pupa and larva.—Unknown.



Figs. 1-4. *Charidiplosis clavijica*. 1, Male head (lateral; spheroid mass on top of head is a contaminant). 2, Male scape, pedicel, and base of flagellum (lateral). 3, Apex of tarsus showing partially recessed claws. 4, Female ninth abdominal segment and cerci (lateral).

Holotype.—♂, on male flower of *Clavija weberbaueri*, 6-x-1995, Jatun Sacha, Ecuador, C. Ott, deposited in the Museo Ecuatoriano de Ciencias Naturales in Quito (MECN).

Other material.—10 ♂, 10 ♀, same data as holotype; 2 ♂, 2 ♀, same data as holotype except IX-1994; specimens deposited in MECN and USNM.

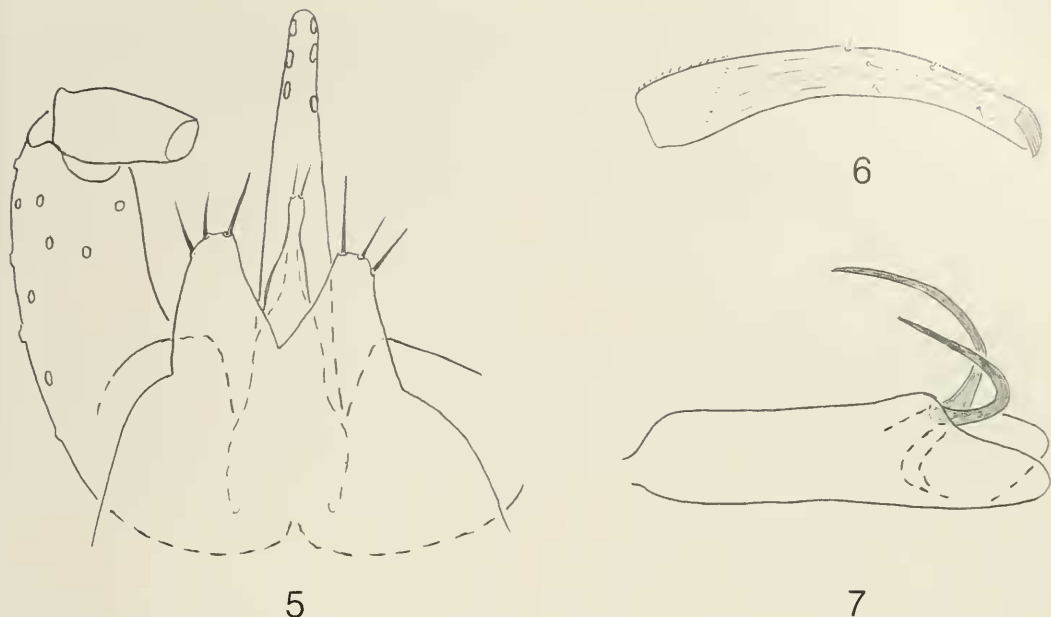
Etymology.—The name *clavijica* means "with *Clavija*."

Remarks on taxonomy.—The new species belongs in *Charidiplosis* because of its narrow, elongate male hypoproct in association with the long, tapering aedeagus, and, in the female, its setose eighth tergite and sternite and long ovipositor and cerci. The species will run to *Charidiplosis* in the key to Neotropical genera of Cecidomyiidi in Gagné (1994).

The only other described species of

Charidiplosis is *C. triangularis* (Felt), a widespread species known from North and South America and reared from mushrooms and decaying organic matter, including cow manure. Larvae of the new species will presumably also be found feeding in decaying organic matter. Adults of *C. triangularis* have been taken repeatedly in cacao flowers in Costa Rica (Young 1985, as *Aphodiplosis triangularis*), although their role on those flowers is also unknown.

Charidiplosis clavijica differs from *C. triangularis* in several derived character states of the fifth tarsomere, the male antenna, and the setation of the ninth segment of the ovipositor. The acropods are largely hidden from view within the covering sides of the apex of the fifth tarsomeres, the tarsal claws are elongate and narrow, and the empodia and pulvilli are rudimentary (Figs. 3, 7). Because gall midges stand on the apices



Figs. 5–7. *Charidiplosis clavijica*. 5, Male genitalia (in part; dorsal). 6, Gonostylus (dorsal). 7, Fifth tarsomere and acropod.

of the tarsi, these derived characters may be adaptations for locomotion or for grasping a particular kind of surface. The male antenna (Figs. 1–2) is gynecoid and short, the pedicel is enlarged, and the flagellum becomes gradually narrower from base to apex. While unique in Cecidomyiinae, this antenna is reminiscent of that of the fast-flying and swarming Lestremiinae of the genera *Anarete* and *Conarete* and suggests the new species may have similar habits. Foreshortened antennae offer less resistance to the air than the several times longer male antennae of *C. triangularis* and most other male Cecidomyiidi. The setae of the female ninth tergum (Fig. 4) are unique for their long length, and the fact that they are curved evidently allows the ninth segment to be retracted readily. We suggest that the long setae function as additional surface area for female pheromones produced in the intersegmental region of the ovipositor and released when the ninth segment is exerted (Solinas and Isidoro 1991, Isidoro et al. 1992).

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